

Introduction to Multimodal Urban Transportation Systems (MUTS)
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Module No # 01

Lecture No # 03

Overview of urban transportation: Challenges in urban transportation

Hello friends, welcome back to the next lecture. So far we have introduced you to urban transportation networks, urbanization in general, how vehicles have increased, how motorization rates have been increased, and we have looked at certain specific issues in urban transport.

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- **Challenges in urban transportation**
 - **Legal and regulatory**
 - **Fragmented institutional framework**
 - **Human resource challenges**
 - **Absence of data**
 - **Comprehensive design standards**

In this lecture we are going to continue looking at the challenges in urban transportation system – we will look at legal and regulatory challenges, how there are different institutional frameworks within which urban transport has to operate which poses certain challenges to it, the labor force or the human resources challenges in public transportation, the lack of data or the lack of integrated data in case of urban transportation systems and also comprehensive design standards or the lack of it. So we will look at these aspects in this lecture.

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Challenges in urban transportation

Legal and regulatory

- Presently, there is no legislation at central, state or local level that comprehensively covers urban transport requirements of Indian cities.
- A few of these have evolved to address specific issues in urban transport resulting in **fragmentation or overlap of jurisdictions.**



So when we start looking at the regulatory structure of urban transportation systems we see that there isn't one legislation that comprehensively addresses the urban transport requirements of Indian cities. So there are multiple different legislations that governs different types of transportation systems. But there is not one, that kind of comprehensively stitches everything together and makes it one coherent document.

And several times what happens is that a transportation system often operates along a road or along a corridor which crosses several jurisdictional boundaries. So when that happens then you are left to deal with different types of regulations across different boundaries which then makes it even more difficult to comply with them. So for example, if a national highway is crossing 2 state boundaries then there may be some regulations meant for the trucking industry in state #1 which may be less stringent, while the truck which is entering into the next state where their regulations may be more stringent.

So the truck company, or the truck operator for example, has to keep in mind these various regulations while the company is transporting different goods. So this is some of the regulatory challenges that transportation system poses to various companies.

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Challenges in urban transportation

Legal and regulatory

- Delhi Metro Railway (Operation and Maintenance) Act, 2002, provides for the operation and maintenance, and to regulate the working of the metro railway in the metropolitan city of Delhi.
- Earlier, Kolkata Metro had enacted a similar act for operation and maintenance of Kolkata Metro as an adjunct to the Indian Railway Act.
- Apart from this there is Metro Railways (Construction of Works) Act, 1978 and Tramways Act, 1886 which affect the metros in urban area.



For example in another case, when we look at the Delhi metro, you will see that the operations there are governed by an act, or there is a law called the Delhi metro operation and maintenance act, that provides for the operational maintenance and to regulate the working of metro railway in the city of Delhi. Similarly there was a law that is that was enacted for Kolkata which was an adjunct to the Indian Railways act.

Apart from these 2 examples, there are other laws, other older laws, such as the tramways act of 1886 which are in effect in other metro areas. But then you see that these are again only laws that govern metro rail operations, the laws that govern and the construction of roads or highways are different. So suddenly when you are dealing with construction of a metro railway, then you have to comply by local regulations of highways or roads in that city, whereas the operations and maintenance act can be carried out as per abovementioned acts. So you see the multiplicity of not only the acts' jurisdictions, but also the different players that are involved in managing these transportation systems makes this a very complex phenomenon.

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Challenges in urban transportation

Legal and regulatory

- The requirements of other modes of mass rapid transport such as the Bus Rapid Transit, Light Rail Transit, Monorails, and several other guided modes, do not have any legislation to support its planning and implementation.
- There are a few other **inter-sectoral coordination** issues such as integrated land use, urban transport planning, multimodal integration, that are not covered in any Act leaving gaps in legislation



The other modes of mass rapid transport such as BRT, LRT, monorails do not have any legislation to support it. Currently if you are to implement a monorail which I believe in India only Mumbai has the mono rail system, there are no specific regulations that are in place that govern the operation or construction of this. So these are all special cases of implementation of these modes.

And if you are to implement such a system in your city, then you would create a special case there as well. So there is a need for an umbrella legislation so that many of these things can be coordinated very well. When it comes to transportation and other aspects such as land use or environment, then that becomes a whole other issue. So if transportation impacts the environment, should be transportation agency comply by only the transportation regulations or do they have to comply with the overall environmental regulation, where a part of which only deals with transport.

So you see that transport is such an infrastructure system that cuts across different geographies, that cuts across different disciplines, that cuts across different administrative jurisdictions, so when you are framing regulations for this it is a challenge, and which has to be overcome over the years.

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Challenges in urban transportation

Legal and regulatory

- The relatively weak enforcement of existing laws combined with minimal penalties contribute to rampant flouting of transport rules and regulations.
- RTO is also responsible for issuing driving licenses, which are cheap and relatively fast to acquire in India.
- This is an important factor contributing to issues of traffic discipline, traffic related accidents, security etc.



The relatively weak enforcement of these existing laws is an issue. Many people would say that there are enough regulations in place but the enforcement of them becomes an issue. We see it often in urban transportation, in especially urban passenger transportation systems, that when regulations are violated and when fees are imposed on them, those fees are also not very high.

So the users or travelers do not seem to mind paying that fee over and over again, and the fee does not act as the deterrent to the user of the transportation system. So not only is the enforcement not very consistent but also the penalty is not very steep, and these are also contributing factors which are not enabling a change in behavior of the people using the transportation network.

So there is a need to look into those matters as well. For example, we all know wearing helmet is essential to saving your life if you get into an accident, but many of us flout that rule while we are riding and only very recently many cities or states have come up with strict enforcement of the regulation. The enforcement of that regulation was very relaxed, so many of us did not change our behavior, so may be now some of the cities are enforcing it more in a strict and consistent manner and that is why the behavior of the users is also changing.

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Challenges in urban transportation

Fragmented institutional framework

- Urban transport systems require several functions to be performed in a **well-coordinated manner** for seamless and comfortable travel experience for commuters.
- Unfortunately, these are performed by multiple agencies under the central, state and city governments which do not necessarily work together.



The other thing is fragmented institutional framework. Right now there are always multiple agencies that are at different levels that frame either the laws or have jurisdiction over the transport agencies. For example transport is usually considered to be state subject, and in certain jurisdictions it also becomes a local subject.

So, now when there are different local laws and there is different state laws then it becomes difficult to comply with these and then enforcement also becomes difficult. So there is a need to develop these legislations in a well-coordinated manner.

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Challenges in urban transportation

Fragmented institutional framework

- According to the Seventh Schedule (Article 246) of the Indian Constitution, urban development, which includes urban transport, is in the State List.
- While, in some states, the transport department undertakes urban transport planning.
- In others states, it is the urban development or municipal administration at the urban level that does it.



For example, according to seventh schedule of the Indian constitution, urban development which includes urban transport, is a state list, while in some states transportation department undertakes urban transportation planning, and in other states urban transportation is being looked after by municipal administration at the urban level. So when municipality is implementing something and a state is implementing the same thing in other cases, then it becomes a challenge to oversee these things; it becomes a challenge to implement consistent regulation throughout the system. So that is one of the challenges.

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Challenges in urban transportation

Fragmented institutional framework

- Apparently, there is an absence of any effective coordinating agency where urban transport and land use can be integrated keeping an overall goal in mind.
- Another weakness is the limited authority delegated at the local city level.
- Municipalities focus more on water supply and garbage disposal as priority than urban transport resulting in no single agency accountable

The slide features a green icon of a classical building with columns and a pediment. The background is light blue with faint icons of a gear, a lightbulb, and a network diagram.

Also there is absence of any effective coordinating agency where urban transport and land use can be integrated. So now this is always a challenge not only in India but also worldwide. Land use and urban transportation go hand in hand. So when we say that what we mean is that if the use on the particular piece of land changes its impact on the transportation network also changes.

So for example, if you have land on which you are currently having a single story independent house, so the number of trips or the number of vehicles that would be generated out of that house is significantly different from if you say for example now convert that land into something that where you build a multi-stored apartment complex. Now, so both are residential, you are not changing any zoning on it, but you are changing the land use and with this change in land use now the apartment complex may have multiple families living in it each family may have multiple vehicles. So the number of vehicles coming out of the same parcel of land will now change. So that will differently impact the transportation network. So this is what we mean to say

when we say that there is a strong relationship between land use and transportation. Now when we talk about the institutional framework, now land use may be not governed by, will not be governed by, any of the transportation legislations laws or regulations, and so there is always a miscommunication between these two agencies as to how to well coordinate between the two.

So only a few urban areas around the world have come about or have come around to solving this problem and most of us are otherwise grappling with this issue.

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Challenges in urban transportation

Human resource challenges

- The capability for undertaking a coordinated approach along of transport issues is generally lacking at the state government and city level
- This is attributed to a lack of **urban transport skills** amongst city and state officials, along with no dedicated organization in city or state to deal with urban transport.

Next comes the human resource challenge. Transportation as a field for employment has been always there. Many are employed, especially when a new highways are built, new rail roads are built, new airports are built, etc. So it does generates a lot of employment, but however, what happens is, these are one-time jobs, so you cannot use the same labor force, for example who has built a particular airport in a city, are now to be taken all the way across the country to build another airport in a different state or different city, you usually do not do it.

So what happens is the skill set that the resource, that the local people, develop they can be used only once or twice. Highways that is why are more popular source of generating income or livelihood because you may expand the highway and your local knowledge always helps you generate a lot of jobs but when it comes to urban transportation other than the construction of any highways or construction of any structures related to transport network, the other sort of human resources are in a very nascent stage of development. Currently, for example how you

build efficient metro rail system. So we often hire help from outside countries, different nations, to help us build these sophisticated systems and sometimes also multinational companies help us operate the systems. So when it comes to skill set that is required to manage new age urban transportation systems, we still have to develop the human resources for it. Of course it is an ongoing process once you have human resource you have to skill them and re-skill them so that they are always up to date with the newer technologies and that is how we can keep up our development module.

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Challenges in urban transportation

Human resource challenges

- Most of the state and city level agencies have suffered from **overstaffing of untrained, unskilled manpower** on the one hand and shortage of qualified technical staff and managerial supervisors on the other.
- The staff and management at these agencies are typically not accustomed to innovation and taking up new tasks.
- Therefore, there is an urgent need for **building capacity** at the individual and institutional level.

Most of the state and city level agencies have suffered from overstaffing of untrained, unskilled man power. So when you look at some of the older institutions in transportation such as the public works department and so on and so forth, you would see that they employ large number of people, however their skills have not been redeveloped or polished over a years. So they are still using older technologies, not keeping pace with the new technologies that are available, which in turn affects the quality of work that is being conducted.

So that kind of a lag or that kind of lack of skilled development and reskilling can be noticed in some of these older agencies.

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Challenges in urban transportation

Absence of data

- The **absence of a database** with scientific management and analysis of urban transport statistics is a serious issue.
- This has severely constrained the ability to formulate sound urban transport plans and reliably assess the impact of the different projects carried out in the cities.

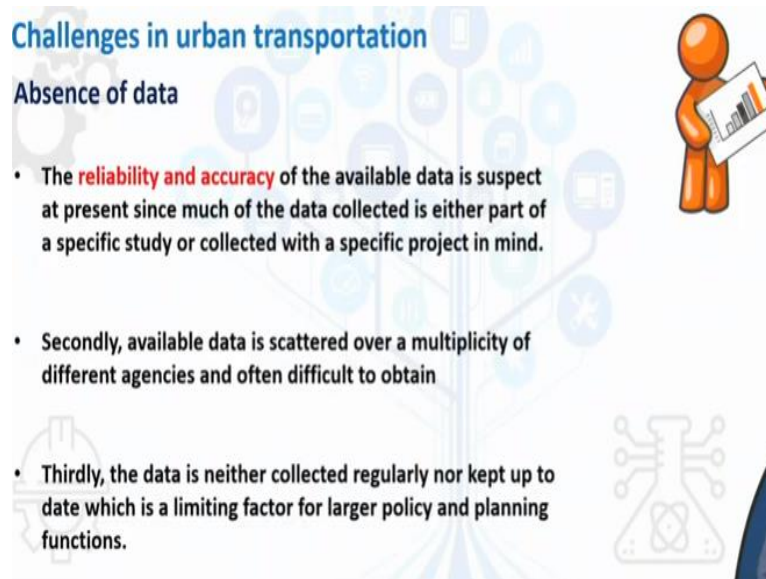


The next challenge in the transportation sector is of data. What you can infer from this is that there is data available, but data is in silos, and data is not available very easily in digitized format especially in the case of the India. So, all through the slides, you are to interpret, that absence of data means the absence of coordinated, easily available, digitized data. So if I were to want to access the data of a different city it would be very difficult for me to sitting in another city to access that data easily, via say an internet or something else.

Of course the data would be made available to me if I were to use the proper channels, write certain application letters and move certain files and I am sure we would obtain the data within the month or so. Thus there is a lag in getting that data. The quality of data is the next thing. So if it takes you lot of time just to get hold of the data, then you have to make sure whether you are receiving the right type of data that you want.

What is the quality of that data? Is there a lot of noise within the data? Is the data clean, or the parameters that you are looking for available in that data? Is that data very recent or is that data very old? So all of these issues are there with transportation related works. However with the advent of big data sources, now there are newer regulations that are being formed which are enabling different agencies to get real time data and use that data for effective governance so that the operations of urban transportation systems improve. So you could overall say that there is data that is available but what lacks is the availability of timely, availability of quality data that is digitized and coordinated.

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Challenges in urban transportation

Absence of data

- The **reliability and accuracy** of the available data is suspect at present since much of the data collected is either part of a specific study or collected with a specific project in mind.
- Secondly, available data is scattered over a multiplicity of different agencies and often difficult to obtain
- Thirdly, the data is neither collected regularly nor kept up to date which is a limiting factor for larger policy and planning functions.

Like we said, reliability and accuracy of the data is something that has a lot to be improved upon and transferability of data from one agency to another. So one agency might have, might be doing a great job on keeping up with all its data elements, but the adjoining agency or the adjoining administrative unit may not have any data. So when you are looking for data at a corridor level or at a regional level then you would only have data for certain segments, and may not have data for the entire segment.


So, this does not help you much in understanding or in developing efficient policies for improving the operations of transportation system.

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Challenges in urban transportation

Absence of data

- The **NUTP 2006** identified the Institute of Urban Transport (IUT) India to be developed as a national institute to build up a database repository.
- However, there is an urgent need to ensure that the data collection is standardized and that the data is regularly collected for it to be meaningfully used.



Of course the national urban transport policy, which was developed in 2006, identified institute of urban transport India to be developed as a national institute to build the database repository. So there are steps that are being taken now to have a digital database where many of the agencies are putting up their data and is downloadable. So efforts are being made which are helping researchers or analyst to actually crunch numbers and bring out solutions to these things.

You should also be aware of certain uses of the data that are being thought of in India. Such as urban observatories, which are implemented at a city level scale. In some of the cities, for example that have cameras at all of their intersections, which generate huge amount of data and there is a central control room where the people are monitoring all of the intersections and crunching the data that is coming out of these cameras to understand real time traffic conditions.

They can predict that if there is an accident that has happened downstream, what is its impact going to be on the upstream traffic. So if you have such kind of continuous data, real time data, coming in from live camera feeds, you can always convert that into real time information. So the data needs are always growing.

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Challenges in urban transportation

Comprehensive design standards

- The **Indian Road Congress (IRC)** has been the nodal agency that sets design guidelines and technical standards for construction of roads and bridges
- A critical feature is that IRC codes are not adhered to for urban road development, they are not mandatory for municipalities



Lastly there is a challenge when it comes to comprehensive designs standards. IRC codes are available for different types of design and sets of different types of design guidelines and technical standards for construction of roads and bridges. However the IRC codes are not adhered to for urban road development, as they are not mandatory for municipalities.

So you have these sets of regulations, you have these set of codes, but they are not made mandatory, so when they are not made mandatory, people usually bypass the standards in the name of cost saving and often construct sub-standard roads or sub-standard bridges or structures and this is never desirable. So this is only about IRC, that has been developed over years and has nearly been perfect in many cases, for the design of roads and bridges.

However now, the new age transportation system such as metro rails or BRT's or bicycle paths or bicycle tracks, these are all new age transportation systems that do not have universal design standards. So you would always question, and when you question system not working, we have to remember that due to the lack of certain standardized designs may be the system was bound to fail. So are we developing certain systems just by looking at standards internationally and trying to build them here.

So many times such systems may not work if they do not have indigenous standards which are catering to the local conditions. So there is need to develop comprehensive design standards when it comes to the new age transportations systems and also there is an need to implement

such design standards or make them enforceable so that local municipalities or states follow them.

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Challenges in urban transportation

Comprehensive design standards

- In the absence of urban road standards, some city-led initiatives have been taken up, notably in Delhi and Bengaluru.
- In Delhi, Unified Traffic and Transportation Infrastructure (Planning & Engineering) Centre (**UTTIPEC**) developed street design especially suited for cities.
- Spaces for vending zones, three-wheeler stops, road infrastructure, pedestrian oriented lighting integrated with tree shade, water permeability etc. were considered

So this is what we have already discussed – about how the urban roads are not mandated to follow IRC and hence many times they build sub-standard roads in the absence of urban road standards. Some city initiatives has been taken up, notably in Delhi and Bangalore, so there are different instances, where for example, along urban roads there are no designs standards that take into consideration the street vendors, that are on footpaths.

So it is very easy to say that we should remove all the street vendors from the footpaths, but these vendors, for them the spot along the footpath is where they earn their livelihood. So it is a tough call to say that – “take your livelihood somewhere else”. So a way to deal with it is to have a sidewalk design standards that provide for, that provide spaces, to these vendors so that they can also earn their livelihood and at the same time the pedestrians also do not have any issues while walking along the sidewalk.

So such integrated, such coordinated, design standards are needed to meet today’s real challenges in our cities, rather than following some design standards in foreign nations or older designs standards that are not applicable in the current day and age. It is always good to have cognizance of international design standards but to implement them blindly is not always

recommended. You have to also take into cognizance what are the local conditions, before you implement them.

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CONCLUSION

- **Overlapping legal framework and jurisdiction creates hurdles for efficient transportation**
- **Multiplicity of institutes makes transportation system complex**
- **Large human resources involved in urban transportation require proper management and training**
- **Design standards for urban roads needs to evolve and mandated**

So in conclusion what we look today is the second set of challenges that are faced by the urban transportation systems. We looked at the different legal and jurisdictional hurdles, we looked at how there are multiplicity of institutions which have to be complied with while you are developing these transportations systems, the issue of labor or human resources in urban transportation, how they have to be skilled from time to time so that they keep up with new technologies.

And finally we looked at the need for various designs standards, coordinated designs standards, that actually look at the existing Indian urban situation. Thank you for your attention.